

Hollow polyacrylonitrile fibres, useful for membrane processes - mfd. by dry-wet or wet spinning from special spinning solns. contg. PAN and non-solvent etc., with simultaneous extrusion of core fluid

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Inventor: KLEE RUDOLF-JUERGEN DR (DE); NEUKAM THEO DR (DE); TUERCK GUENTER DR (DE); NAUNHEIM WILFRIED (DE)
Applicant: BAYER AG (DE)
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Abstract of DE41 13420

Hollow polyacrylonitrile (PAN) fibres (I) (a) contain at least 85 (pref. 99-100) wt.% acrylonitrile, (b) the pore structure in the sheath is asymmetrical, enabling high permeation rates, (c) the original pore structure in the wet fibre is stabilised for more than 6 months in the dry state, (d) the internal dia. (dF) is 0.3-2.5 (pref. 0.8-2.0)mm, (e) ratio of outside dia. (DF) to dF = 1.1-1.8, (f) the fibres have a high bursting strength for a given geometry and separating properties and (g) the sepn. limit = 1-3000 k-dalton. Also claimed is a process for the prodn. of (I), by mixing the PAN with a cold solvent such as DMAC or DMF contg. 5-30 wt.% non-solvent (II) (w.r.t. solvent and solids), opt. with addn. of 0-35 wt.% pigments (e.g. TiO₂), evacuating the homogenised mixt., pumping it through a heater at 130-150 deg. C, cooling to the spinning temp. (80-130 deg. C), filtering and pumping through a conventional perforated hole/ring nozzle with simultaneous extrusion of a core material by the dry/wet process or the conventional wet spinning process; (II) has b.pt. at least 30 deg. C higher than the solvent, is readily miscible with water and is a non-solvent for the polymer which does not cause pptn. in the spinning soln.; the core fluid is glycerol, glycerol/water or nitrogen; the spun, pptd. fibres are subjected to various successive washings and after treatments, using at least one water bath at at least 80 (pref. 98-100) deg. C, and all liq. residues (including water) are removed by exchange with monoalcohols of b.pt. below 100 deg. C, pref. ethanol, followed by evapn. to give dry, stable hollow fibres.
USE/ADVANTAGE - The hollow PAN fibres have improved properties and a pore structure which is stable for more than 6 months in the dry state. Useful in membrane processes such as ultrafiltration and microfiltration.

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